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EXAMINER	
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ART UNIT	PAPER NUMBER
4154	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/560,755	IKIADES ET AL.	
	Examiner	**Art Unit**	
	Jack K. Wang	4154	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/13/2005*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Padawer et al. (US Patent # 5,484,121) (already of record).

Consider claim 1, Padawer et al. clearly shown and disclose an apparatus for detecting ice accretion comprising an electromagnetic radiation emitter (radiant source element) (38, Fig. 3a) and an array of sensors (detector elements) (40, Fig. 3a) the emitter being located intermediate of the array of sensors and at least some of the sensors being located at different distances from the emitter (Column 2 lines 33-35).

Consider claim 2, Padawer et al. clearly shown and disclose the apparatus which the sensors (detector elements) (60, Fig. 3e) are substantially symmetrical about the emitter (radiant source element) (24, Fig. 3e).

Consider claim 3, Padawer et al. clearly shown and disclose the apparatus which the array of sensors comprises a first set of sensors (4, Fig. 1) and a second set of sensors (4, Fig. 1), the first and second sets of sensors being arranged to follow respective paths generally away from the emitter.

Consider claim 4, Padawer et al. clearly shown and disclose the apparatus which the sets of sensors (60, Fig. 3e) are arranged in respective radial paths.

Consider claim 5, Padawer et al. clearly shown and disclose the apparatus which the array of sensors further comprises third and fourth sets of sensors, the first, second, third and fourth sets of sensors together forming a substantially cruciform arrangement of sensors about the emitter (Fig. 3c) (Column 2 lines 58-59).

Consider claim 6, Padawer et al. clearly shown and disclose the apparatus which the array of sensors (detector elements) (40, Fig. 3a) is substantially flush with a surface (22, Fig. 3a)) in which the array is mounted (Column 2 lines 22-25).

Consider claim 7, Padawer et al. clearly shown and disclose the apparatus which is an apparatus for detecting ice accretion (formation) on an aircraft surface (Column 4 lines 13-17).

Consider claim 8, Padawer et al. clearly shown and disclose a method of monitoring ice accretion comprising emitting an electromagnetic radiation signal from an emitter (source element) (34, Fig. 3a), detecting diffused radiation which comprises radiation which is scattered and/or reflected by a layer of accreted ice, detection of the diffused radiation being effected by an array of sensors (detector element) (40, Fig. 3a), at least some of the sensors being at different distances from the emitter (Column 2 lines 33-35), and the method further comprising comparing detected intensity of the diffused radiation at a particular distance from the emitter to a respective predetermined value so as to determine the type of accreted ice (Column 2 lines 22-33).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Padawer et al. (US Patent # 5,484,121) (already of record), and further in view of Burns (US Patent # 5,760,711).

Consider claim 9, Padawer et al. teaches similar invention except a method which comprises comparing the detected intensity of the diffused radiation at different distances from the emitter to respective predetermined values so as to determine the type of accreted ice.

In the same field of endeavor, Burns teaches a method which comprises comparing the detected intensity of the diffused radiation (amount of light pulses reflected) at different distances from the emitter to respective predetermined values so as to determine the type of accreted ice (Column 6 lines 22-27) for the benefit of detecting various ice formation on the wing surface.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a method which comprises comparing the detected intensity of the diffused radiation at different distances from the emitter to respective predetermined values so as to determine the type of accreted ice as shown in Burns, in Padawer et al. device for the benefit of detecting various ice formation on the wing surface.

Consider claim 10, Padawer et al. teaches similar invention except a method which comprises determining whether the detected intensity of diffused radiation at a particular distance from the emitter is above a predetermined threshold value.

In the same field of endeavor, Burns teaches a method which comprises determining whether the detected intensity of diffused radiation (amount of reflected light) at a particular

distance from the emitter (modulated pulser) is above a predetermined threshold value (Column 6 lines 19-27) for the benefit of providing the warning and alerts the pilot.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a method which comprises determining whether the detected intensity of diffused radiation at a particular distance from the emitter is above a predetermined threshold value as shown in Burns, in Padawer et al. device for the benefit of providing the warning and alerts the pilot.

Consider claim 11, Padawer et al. teaches similar invention except a method which comprises determining the type of accreted ice in response to which sensors at different distances from the emitter detect scattered and/or reflected intensity of diffused radiation above respective predetermined threshold values.

In the same field of endeavor, Burns teaches a method which comprises determining the type of accreted ice in response to which sensors at different distances from the emitter detect scattered and/or reflected intensity of diffused radiation (amount of light pulses are reflected) above respective predetermined threshold values (Column 6 lines 19-27) for the benefit of providing the warning and alerts the pilot.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a method which comprises determining the type of accreted ice in response to which sensors at different distances from the emitter detect scattered and/or reflected intensity of diffused radiation above respective predetermined threshold values as shown in Burns, in Padawer et al. device for the benefit of providing the warning and alerts the pilot.

5. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Padawer et al. (US Patent # 5,484,121) (already of record) as applied to claim 8 above, and further in view of Gerardi et al. (US Patent # 5,398,547).

Consider claim 12, Padawer et al. teaches similar invention except a method which comprises selecting a look-up table of detected intensity values of diffused radiation and ice thickness values in response to the determined ice type.

In the same field of endeavor, Gerardi et al. teaches a method which comprises selecting a look-up table of detected intensity values of diffused radiation and ice thickness values in response to the determined ice type (Column 3 lines 65-68 and Column 4 lines 1-2) for the benefit of providing reference to enhance communication and convey the message to the pilot.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a method which comprises selecting a look-up table of detected intensity values of diffused radiation and ice thickness values in response to the determined ice type as shown in Gerardi et al., in Padawer et al. device for the benefit of providing reference to enhance communication and convey the message to the pilot.

Consider claim 13, Padawer et al. teaches similar invention except a method which comprises determining ice thickness by locating a value of ice thickness in the respective look-up table which corresponds to a detected intensity of diffused radiation at a particular distance from the emitter.

In the same field of endeavor, Gerardi et al. teaches a method which comprises determining ice thickness by locating a value of ice thickness in the respective look-up table

which corresponds to a detected intensity of diffused radiation at a particular distance (Column 4 lines 2-7) for the benefit of informing the ice build up condition to the pilot.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a method which comprises determining ice thickness by locating a value of ice thickness in the respective look-up table which corresponds to a detected intensity of diffused radiation at a particular distance from the emitter as shown in Gerardi et al., in Padawer et al. device for the benefit of informing the ice build up condition to the pilot.

Consider claim 14, Padawer et al. teaches similar invention except a method which comprises using the value of detected intensity of diffused radiation which corresponds to a sensor position which is closest to the emitter to determine the ice thickness from the look-up table.

In the same field of endeavor, Gerardi et al. teaches a method which comprises using the value of detected intensity of diffused radiation which corresponds to a sensor position which is closest to the emitter (Fig. 2B) to determine the ice thickness from the look-up table (Fig. 3) (Column 8 lines 3-8) for the benefit of reducing the noise and improve accuracy of the data collected.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a method which comprises using the value of detected intensity of diffused radiation which corresponds to a sensor position which is closest to the emitter to determine the ice thickness from the look-up table as show in Gerardi et al., in Padawer et al. device for the benefit of reducing the noise and improve accuracy of the data collected.

6. Claim 15-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Padawer et al. (US Patent # 5,484,121) (already of record) in view of Stallabrass et al. (US Patent # 3,940,622).

Consider claims 15, Padawer et al. teaches a data processing equipment for ice detection apparatus comprising comparator means, which diffused radiation is detected by an array of sensors at least some of the sensors (60, Fig. 3e) being located at different distances from an electromagnetic radiation emitter (24, Fig. 3e), except the comparator means, in use, receiving signals representative of the intensity of diffused radiation which comprises radiation scattered and/or reflected by a layer of accreted ice, the comparator means being configured to compare detected intensity of the diffused radiation to a predetermined value and determine whether said value of detected intensity of the diffused radiation is above the predetermined value so as to enable the data processing equipment to determine the type of accreted ice.

In the same field of endeavor, Stallabrass et al. teaches the comparator means (A1-A5, Fig. 9), in use, receiving signals representative of the intensity of diffused radiation which comprises radiation scattered and/or reflected by a layer of accreted (build-up) ice (Column 5 lines 55-65), the comparator means being configured to compare detected intensity of the diffused radiation to a predetermined value and determine whether said value of detected intensity of the diffused radiation is above the predetermined value (Column 2 lines 51-55) so as to enable the data processing equipment to determine the type of accreted ice (Column 6 lines 4-21) for the benefit of providing the ice build-up information to the pilot and generate the warning when the condition exceed predetermine threshold.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the comparator means, in use, receiving signals representative of the intensity of diffused radiation which comprises radiation scattered and/or reflected by a layer of accreted ice, the comparator means being configured to compare detected intensity of the diffused radiation to a predetermined value and determine whether said value of detected intensity of the diffused radiation is above the predetermined value so as to enable the data processing equipment to determine the type of accreted ice as shown in Stallabrass et al., in Padawer et al. device for the benefit of providing the ice build-up information to the pilot and generate the warning when the condition exceed predetermine threshold.

Consider claim 16, Padawer et al. teaches similar invention except data processing equipment which the comparator means is configured to compare the detected intensity of the diffused radiation to predetermined values and determine whether said values of detected intensity of the diffused radiation are above the predetermined values so as to enable the data processing equipment to determine the type of accreted ice.

In the same field of endeavor, Stallabrass et al. teaches data processing equipment which the comparator means (A1-A5, Fig. 9) is configured to compare the detected intensity of the diffused radiation (Column 5 lines 55-65) to predetermined values and determine whether said values of detected intensity of the diffused radiation are above the predetermined values so as to enable the data processing equipment to determine the type of accreted ice (Column 2 lines 51-55) for benefit of providing the ice build-up information to the pilot and generate the warning when the condition exceed predetermine threshold.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include data processing equipment which the comparator means is configured to compare the detected intensity of the diffused radiation to predetermined values and determine whether said values of detected intensity of the diffused radiation are above the predetermined values so as to enable the data processing equipment to determine the type of accreted ice as shown in Stallabrass et al., in Padawer et al. device for benefit of providing the ice build-up information to the pilot and generate the warning when the condition exceed predetermine threshold.

Consider claim 17, Padawer et al. teaches similar invention except data processing equipment which the comparator means is configured to compare detected intensity of diffused radiation at different distances from the emitter to respective predetermined values.

In the same field of endeavor, Stallabrass et al. teaches data processing equipment which the comparator means (A1-A5, Fig. 9) is configured to compare detected intensity of diffused radiation at different distances from the emitter to respective predetermined values (Fig. 10) (Column 2 lines 51-55) for the benefit of providing the ice build-up information to the pilot and generate the warning when the condition exceed predetermine threshold.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include data processing equipment which the comparator means is configured to compare detected intensity of diffused radiation at different distances from the emitter to respective predetermined values as shown in Stallabrass et al., in Padawer et al. device for the benefit of for benefit of providing the ice build-up information to the pilot and generate the warning when the condition exceed predetermine threshold.

Consider claim 18, Padawer et al. teaches similar invention except the data processing equipment in which the comparator means comprises multiple comparators, each comparator being input with a signal which is representative of a detected intensity of diffused radiation at a respective distance from the emitter.

In the same field of endeavor, Stallabrass et al. teaches the data processing equipment in which the comparator means comprises multiple comparators (A1-A5, Fig. 9), each comparator being input with a signal which is representative of a detected intensity of diffused radiation at a respective distance from the emitter (Column 6 lines 4-21) for the benefit of improving the accuracy of data detection.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the data processing equipment in which the comparator means comprises multiple comparators, each comparator being input with a signal which is representative of a detected intensity of diffused radiation at a respective distance from the emitter as shown in Stallabrass et al., in Padawer et al. device for the benefit of improving the accuracy of data detection.

Consider claim 19, Padawer et al. teaches similar invention except data processing equipment which each comparator is configured to compare a received detected intensity of diffused radiation to a respective threshold value.

In the same field of endeavor, Stallabrass et al. teaches data processing equipment which each comparator (A1-A5, Fig. 9) is configured to compare a received detected intensity of diffused radiation to a respective threshold (predetermine) value (Column 2 lines 51-55) for

benefit of providing the ice build-up information to the pilot and generate the warning when the condition exceed predetermine threshold.

Consider claim 20, Padawer et al. teaches similar invention except data processing equipment, which outputs of the comparators are indicative of the type of the accreted ice.

In the same field of endeavor, Stallabrass et al. teaches data processing equipment, which outputs of the comparators are indicative of the type (liquid water content) of the accreted (build-up) ice (Column 6 lines 4-21) for the benefit of providing the additional information to the pilot regarding the type of ice accreted.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include data processing equipment, which outputs of the comparators are indicative of the type of the accreted ice as shown in Stallabrass et al., in Padawer et al. device for the benefit of providing the additional information to the pilot regarding the type of ice accreted.

Consider claim 21, Padawer et al. teaches similar invention except data processing equipment which the outputs of the comparators are input into a logic array, the logic array being configured to output a binary number which is indicative of the type of the accreted ice.

In the same field of endeavor, Stallabrass et al. teaches the data processing equipment which the outputs of the comparators (A1-A5, Fig. 9) are input into a logic array (gate), the logic array being configured to output a binary number which is indicative of the type of the accreted ice (Fig. 9) (Column 6 lines 36-43) for the benefit of providing the additional information to the pilot regarding the type of ice accreted.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include data processing equipment which the outputs of the comparators are input into a logic array, the logic array being configured to output a binary number which is indicative of the type of the accreted ice as shown in Stallabrass et al., in Padawer et al. device for the benefit of providing the additional information to the pilot regarding the type of ice accreted.

Consider claim 22, Padawer et al. teaches similar invention except data processing equipment which comprises a memory which stores look-up tables of detected intensity values of diffused radiation and corresponding ice thickness values for different ice types.

In the same field of endeavor, Stallabrass et al. teaches the data processing equipment which comprises a memory which stores look-up tables of detected intensity values of diffused radiation and corresponding ice thickness values for different ice types (Column 6 lines 44-46) for the benefit of providing the additional information to the pilot regarding the type of ice accreted.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include data processing equipment which comprises a memory which stores look-up tables of detected intensity values of diffused radiation and corresponding ice thickness values for different ice types as shown in Stallabrass et al., in Padawer et al. device for the benefit of providing the additional information to the pilot regarding the type of ice accreted.

Consider claim 23, Padawer et al. teaches similar invention except data processing equipment which is configured to select a look-up table in response to the determined ice type.

In the same field of endeavor, Stallabrass et al. teaches the data processing equipment which is configured to select a look-up table in response to the determined ice type (Column 6 lines 44-46) for the benefit of providing the additional information to the pilot regarding the type of ice accreted.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include data processing equipment which is configured to select a look-up table in response to the determined ice type as shown in Stallabrass et al., in Padawer et al. device for the benefit of providing the additional information to the pilot regarding the type of ice accreted.

Consider claim 24, Padawer et al. teaches similar invention except the data processing equipment which is configured to determine ice thickness by locating an ice thickness value in the look-up table which corresponds to a detected intensity of diffused radiation.

In the same field of endeavor, Stallabrass et al. teaches the data processing equipment which is configured to determine ice thickness by locating an ice thickness value in the look-up table which corresponds to a detected intensity of diffused radiation (Column 1 lines 45-50) for the benefit of triggering alarm and send the warning to the pilot when the thickness value is exceed the predetermine value.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the data processing equipment which is configured to determine ice thickness by locating an ice thickness value in the look-up table which corresponds to a detected intensity of diffused radiation as shown in Stallabrass et al., in Padawer et al. device

for the benefit of triggering alarm and send the warning to the pilot when the thickness value is exceed the predetermine value.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Barnes (US Patnet # 5,596,320) "System for detection of ice, water, glycol solution, and other chemical species".

b. Kim (US Patent # 5,748,091) "Fiber optic ice detector".

c. Stolarczyk et al. (US Patent # 5,474,261) "Ice detection apparatus for transportation safety".

d. Hansman, Jr. et al. (US Patent # 5,313,202) "Method of and apparatus for detection of ice accretion".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack K. Wang whose telephone number is 571-272-1938. The examiner can normally be reached on M-F 7:30AM - 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on 571-272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JKW/

/Angela Ortiz/

Supervisory Patent Examiner, Art Unit 4154